

List of Claims:

1-32. (previously cancelled)

33. (currently amended) A transgenic plant ~~resistant to the effects of externally imposed stresses, wherein the transgenic plant comprises~~ comprising a nucleotide sequence comprising an exogenous tonoplast pyrophosphate driven H⁺ pump driven pump gene operably linked to one or more regulatory elements that result in ~~altered~~ upregulated expression of vacuolar pyrophosphatase.

34. (currently amended) The transgenic plant of Claim 33 wherein ~~the plant the externally imposed stresses to which the plant is resistant~~ to externally imposed stresses are selected from the group consisting of water deficit and exposure to chilling temperatures.

35. (currently amended) The transgenic plant of claim 34, wherein the exposure to chilling temperatures comprises exposure to temperatures as low as ~~10-0°C~~ 10°C for a period of 24 hours or more.

36. (currently amended) The transgenic plant of claim 34, wherein the exposure to chilling temperatures comprises exposure to temperatures ~~below~~ at least as low as 0°C for up to 24 hours.

37. (previously presented) The transgenic plant of claim 34, wherein the exposure to chilling temperatures comprises exposure to temperatures below 0°C for up to 24 hours.

38. (previously presented) The transgenic plant of claim 33, wherein the exogenous tonoplast pyrophosphate driven H⁺ pump gene encodes AVP1, or a homolog thereof.

39. (previously presented) The transgenic plant of claim 33, wherein the AVP1, or homolog thereof is encoded by a gene present in a construct designed to overexpress AVP1, or a homolog thereof.

40. (currently amended) The transgenic plant of claim 39, wherein the ~~construct comprises the AVP1 gene, or homolog thereof, is~~ operably linked to at least one or more regulatory elements ~~comprising nucleic acid~~ element that results in overexpression of AVP1.

41. (currently amended) The transgenic plant of Claim ~~38~~ 40 wherein the at least one regulatory element ~~is AVP1 gene or homolog thereof is operably linked to one or more regulatory elements comprising a chimeric promoter~~ selected from the group consisting of tissue specific promoters, constitutive promoters, inducible promoters and combinations thereof.

42. (currently amended) The transgenic plant of Claim 41, wherein ~~at least one the AVP1 gene is operably linked to one or more~~ regulatory element ~~elements comprising~~ comprises a tissue-specific promoter that promotes expression of AVP1 in pollen.

43. (currently amended) The transgenic plant of claim ~~41~~40, wherein at least one regulatory element the AVP1 gene, or homolog thereof, is operably linked to one or more regulatory elements comprising comprises a double tandem enhancer of a 35S CaMV promoter operably linked to the AVP1 gene or homolog thereof.
44. (currently amended) The transgenic plant of claim ~~38~~ 40, wherein the AVP1 gene, or homolog thereof is derived from a wild type plant.
45. (currently amended) The transgenic plant of claim ~~38~~ 40, wherein the AVP1 gene, or homolog thereof is derived from a transgenic plant.
46. (withdrawn)
47. (previously presented) A seed produced by the plant of claim 33.
48. (previously presented) A progeny plant produced by the plant of claim 33.
- 49-50. (canceled)
51. (currently amended) One or more plant cells comprising ~~exogenous nucleic acid that alters expression a tonoplast pyrophosphate H⁺ pump gene that causes over expression of~~ vacuolar H⁺ pyrophosphatase in the ~~plant cell~~ one or more plant cells.
- 52-53. (canceled)
54. (currently amended) The one or more plant cells of claim 51, wherein the one or more cells are obtained from tissue sources selected from the group consisting of roots, stems, seeds and flowers.
55. (canceled)
56. (currently amended) The one or more plant cells of claim 51, wherein the AVP1 is ~~derived~~ obtained from a wild type plant of the same species ~~from which~~ as the transgenic plant is ~~derived~~.
57. (currently amended) The one or more plant cells of claim 51, wherein the AVP1 is ~~derived~~ obtained from a wild type plant of a different species ~~from which~~ as the transgenic plant is ~~derived~~.
58. (currently amended) A method for increasing production of seeds in plants comprising the steps of:

- (a) providing pollen from a first plant, wherein the first plant is a transgenic plant in accordance with claim 33 ~~has been transformed with exogenous nucleic acid that alters expression of vacuolar pyrophosphatase to create a transgenic plant~~;
- (b) fertilizing a second plant or the transgenic plant with pollen from the transgenic plant; and
- (c) culturing the fertilized plant until the plant produces an increased number of mature seeds compared with a non-transgenic plant.

59. (currently amended) ~~The method of claim 58, wherein the A transgenic plant exogenous nucleic acid comprises~~ comprising a regulatory element operably linked to the AVP1 gene that which causes alters overexpression of vacuolar pyrophosphatase wherein enhanced traits, selected from the group consisting of longer root hairs, enhanced seed production, increased salt and drought tolerance and resistance to freeze are observed in the transformed plant compared to the counterpart wild type plant. to result in conferral of altered phenotypic traits onto the transformed plant.

60-65 (canceled).

66. (currently amended) The method of claim ~~62~~ 58, wherein the tonoplast pyrophosphate driven H⁺ pump gene is operably linked to one or more regulatory elements comprising a chimeric promoter in the transgenic plant.

67. (previously presented) The method of claim 66, wherein said exogenous tonoplast pyrophosphate driven H⁺ pump gene encodes AVP1.

68. (currently amended) A transgenic plant seed produced by the method of claim 58.

69. (previously presented) A progeny plant grown from the plant seed of claim 68.

70. (currently amended) The method of claim 58, wherein the first and second plants are ~~from the species~~ N. tabacum or A. thaliana.

71-76. (cancelled)

77. (currently amended) A transgenic plant with an enhanced capacity compared to wild-type plant counterpart to retain solute species in a vacuole of the plant, wherein the plant has been transformed with a tonoplast pyrophosphate driven H⁺ pump gene exogenous nucleic acid that alters increases expression of vacuolar pyrophosphatase in the plant.

78. (currently amended) The transgenic plant of claim 77, wherein the ~~exogenous nucleic acid comprises a~~ tonoplast pyrophosphate driven H⁺ pump gene ~~encoding~~ encodes AVP1, or a homolog thereof.

79. (currently amended) The transgenic plant of claim 77, wherein the ~~exogenous nucleic acid comprises one or more regulatory elements that enhance the expression of vacuolar pyrophosphatase encoded by endogenous nucleic acid~~ tonoplast pyrophosphatase driven H⁺ pump gene expression is operably linked to at least one regulatory element that increases expression of vacuolar pyrophosphatase.

80. (currently amended) A method for enhancing the capacity of a plant vacuole to retain solute species comprising the step of introducing into the genome of a plant ~~exogenous nucleic acid that alters~~ a tonoplast pyrophosphatase driven H⁺ pump gene that causes overexpression of vacuolar pyrophosphatase in the plant, thereby enhancing retention of solute species in the plant vacuole compared with retention of solute species in a wild-type plant vacuole.

81. (currently amended) The method of claim 80, wherein the ~~exogenous nucleic acid comprises a~~ tonoplast pyrophosphatase driven H⁺ pump gene is operably linked to at least regulatory element ~~one or more regulatory elements~~ that results in enhancement of the plant's capacity to retain solute in a vacuole of the plant.

82. (previously presented) The method of claim 81, wherein the tonoplast pyrophosphatase driven H⁺ pump gene encodes AVP1, or a homolog thereof.

83. (canceled)

84. (new) A transgenic plant having incorporated into its genome a chimeric vacuolar pyrophosphatase (VPP) gene operably linked to a 35S (CaMV) promoter double tandem enhancer gene that causes overexpression of said gene in said plant.

85. (new) The transgenic plant of claim 84 selected from the group consisting of tomato, tobacco, rice, tobacco, sorghum, cucumber, lettuce, turf grass, Arabidopsis and corn.

86. (new) The transgenic plant of claim 84 wherein the *VPP* gene is a plant or yeast gene.

87. (new) he transgenic plant of claim 84 wherein the *VPP* gene is *AVPI* or *AVP2*.

88. (new) A progeny or seed of the transgenic plant of claim 84.

89. (new) A plant cell from the transgenic plant of claim 84 having incorporated into its genome a chimeric vacuolar pyrophosphatase gene operably linked to a 35S (CaMV) promoter double tandem enhancer gene that causes overexpression of the vacuolar pyrophosphatase gene in said cell.

90. (new) A method for producing a genetically transformed plant that exhibits salt tolerance to one or more salts selected from the group consisting of NaCl, KCl and CaCl₂, comprising the steps of:

- a) inserting into the genome of a plant cell a chimeric gene, which comprises
 - i) a DNA sequence encoding a vacuolar pyrophosphatase (*VPP*) gene;
 - ii) a 35S CaMV promoter operably linked to the DNA sequence of step i);
 - iii) a double tandem enhancer operably linked to the promoter of step ii);
 - b) obtaining the transformed plant cells; and
 - c) regenerating a genetically transformed plant from said plant cell wherein said plant exhibits salt tolerance.
91. (new). The method of claim 90 wherein the genetically transformed plant is selected from the group consisting of tomato, tobacco, rice, tobacco, sorghum, cucumber, lettuce, turf grass, Arabidopsis and corn.